

CARBOB Regulatory Revisions

CARB Phase 3 Gasoline Workshop

July 25, 2000

Western States Petroleum Association

CARBOB Revision Goals

- Adequate gasoline supply
 - Product selection in marketplace
 - Manufacturing flexibility
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- Gasoline meets CARB standards
 - Maintain current enforcement scheme
 - Caps downstream
 - Flats and averages at production/import point

CARBOB/Ethanol Issues

- Terminal QA/QC requirements - *deleted 12/99*
- Oxygen cap - *increased to 3.7 wt.% 12/99*
- CARBOB/Ethanol blending model
- Ethanol quality specifications
- ***Tank transitions***
- Pipeline interface handling
- Recordkeeping / Reporting / PTDs

Tank Transitions with MTBE

- MTBE added at refinery as a variable blend component
- Blends may contain: 11-15 vol% MTBE (in RFG)
0-15% vol MTBE (in non-RFG)
- MTBE addition can be changed every blend depending on economics and needs
- Gasolines with different MTBE contents are fungible at all locations (refineries, terminals and retail)

Tank Transitions with CARBOB/Ethanol

- Refineries produce CARBOB & specify ethanol % (range) to be added at terminals to meet CaRFG regulations
- Blends may contain: 5.7-10 vol% ethanol (RFG areas)
0-10 vol% ethanol (nonRFG areas)
- Two CARBOBs are only fungible if they require the same ethanol % (range) addition (i.e. 5.7-6.5 vol% ethanol)
- CARBOB and non-oxygenated CaRFG are not fungible

CARB Regs. Prohibiting Commingling

2266.5(f)(1): No person may combine any CARBOB that has been supplied from the facility at which it was produced or imported with any other CARBOB, gasoline, blendstock or oxygenate, except:

(A) Oxygenate of the type and amount specified.....

(B) Other CARBOB for which the same oxygenate type and amount was specified.....

2266.5(f)(2): The executive officer may enter into a written protocol with any person to identify conditions under which the person may lawfully combine CARBOB with California gasoline or other CARBOB during a changeover in service of a storage tank for a legitimate operational business reason.....

Potential Reasons to Change Ethanol %

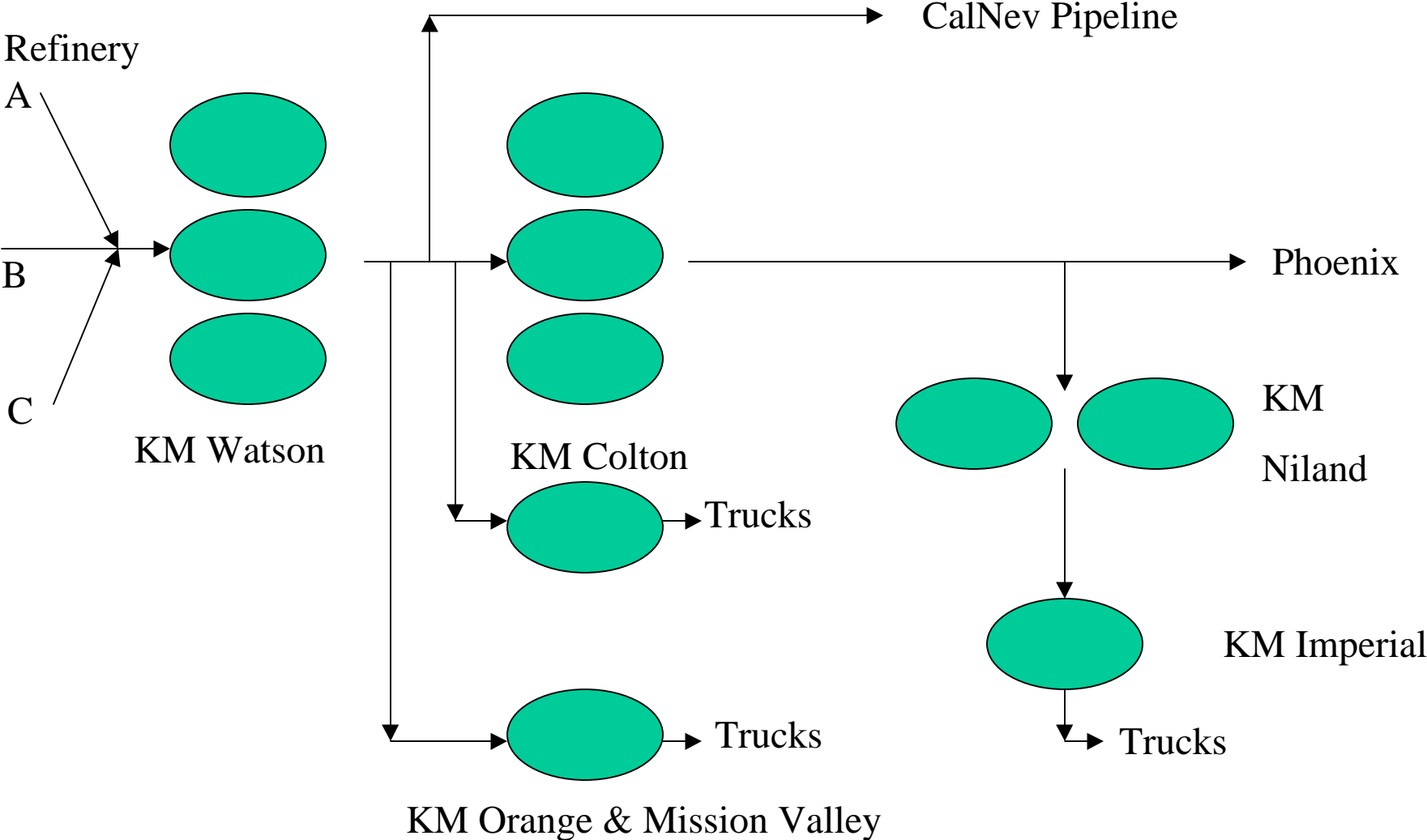
- Short-term economic factors
 - Ethanol vs. gasoline blending economics
 - Ethanol supply shortages
 - Gasoline supply
- Seasonal factors
 - Summer vs. winter RVP standards
 - Winter oxygen mandate (South Coast)
- Location factors (RFG vs. non-RFG)
- Gasoline grade factors (premium vs. regular)

CARBOB Commingling Challenges

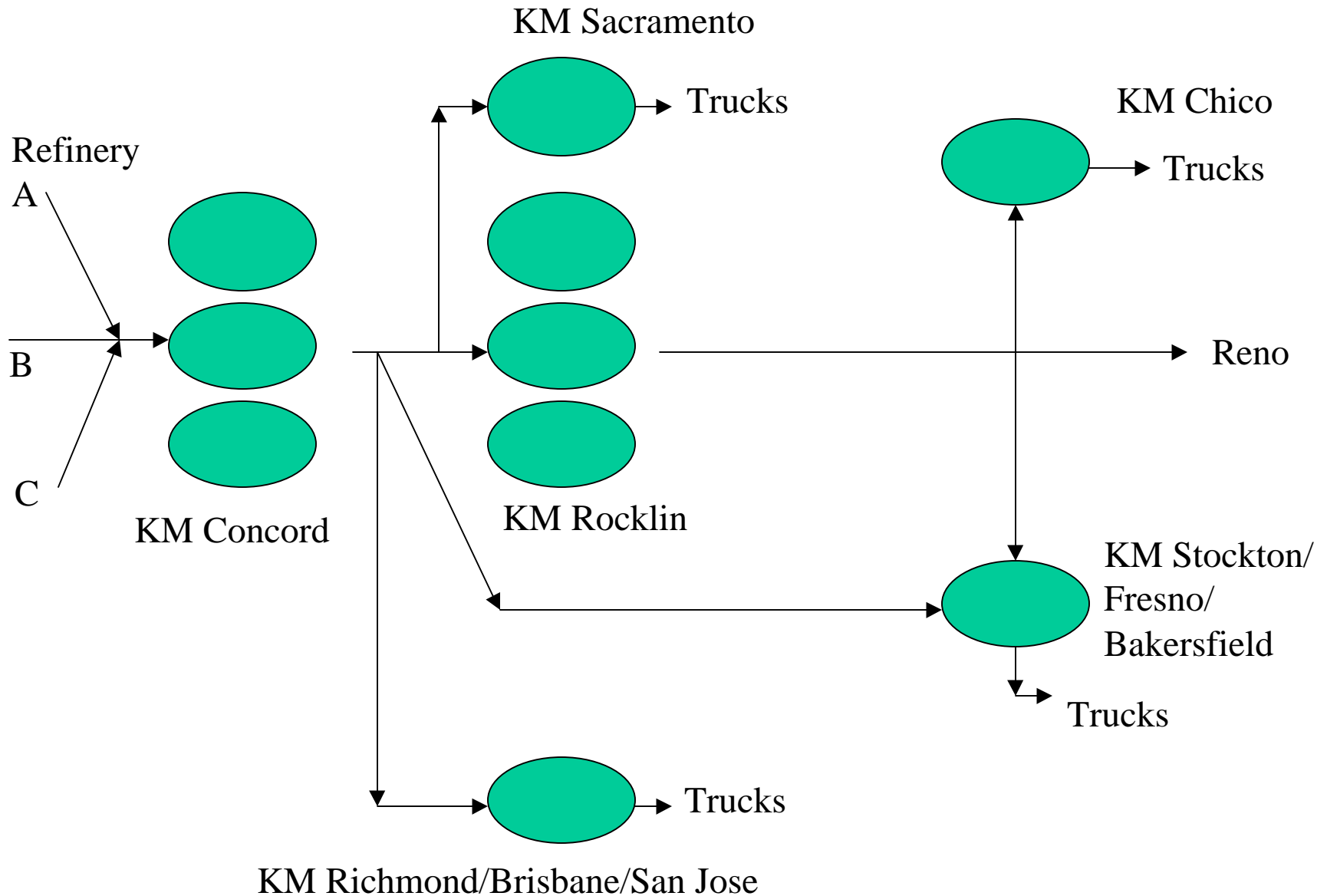
CARBOB is typically:

- Sub-RVP in summer (<6.4 psi EPA minimum)
- Sub-octane
- Requires addition/dilution of ethanol to be complying
CaRFG:
 - Octane
 - Product specs: (sulfur, olefin, benzene, aromatics, oxy, T50, T90)
and/or
 - Predictive model standards (hydrocarbons, NOx and toxics)

Kinder Morgan S. Cal. Distribution System



Kinder Morgan N. Cal. Distribution System



Tank Transitions - *A Few Conclusions*

- Commingled system
- Many tanks to convert
 - Refinery tankage
 - Up to four sets of KM tanks (Watson to Imperial)
 - Retail tanks
- To convert from Gasoline “A” to “B”
 - Process to arrive at consensus among shippers takes time
 - Proprietary pipeline systems are simpler
 - Takes volume & typically 2 batches
- No location or conversion is identical

A Few Conclusions (cont.)

- Terminal tank transitions will be infrequent but could occur:
 - in spring
 - in fall
 - due to market conditions
- Terminal conversions could
 - involve entire distribution chain
 - occur in proprietary pipeline systems
- Need to have clear guidelines for tank transitions that are fully understood by entire industry to execute transitions quickly and effectively:
 - Build in to regulation?
 - Industry-wide protocol?

Potential Tank Transitions

<u><i>FROM</i></u>	<u><i>TO</i></u>
CaRFG w/ MTBE (to move to CaRFG3)	CARBOB
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CARBOB “A” (i.e. requiring 5.7% ethanol)	CARBOB “B” (i.e. requiring 7.7% ethanol)
CARBOB	CaRFG (non-oxygenated)
CaRFG (non-oxygenated)	CARBOB

CARBOB to oxy-free CaRFG Transitions

Key points

- Summer transitions are difficult due to RVP limits (7.2 max/6.4 min)
- Winter transitions are less difficult due to higher RVP maxima
- Transitions between CARBOBs requiring different amounts of ethanol should not cause RVP problems since variable amounts of ethanol have very little impact on the resulting gasoline's RVP.
- Maintenance of octane levels adds a level of difficulty downstream when changing ethanol levels or from CARBOB to oxy-free
- Must maintain current enforcement structure
 - Predictive model with flats and averages at refinery
 - Caps downstream

Winter Season Transitions

“Simple Mixing”

- At the start of the transition terminals would reduce their inventory to a practical minimum (similar to how they do today for RVP transitions).
- **CARBOB to oxy-free CaRFG** (typically would occur in the Spring)
 - Refiners would start to produce/ship complying oxy-free CaRFG.
 - The terminals would continue to add ethanol until the terminal tanks had been transitioned to oxy-free CaRFG (typically two turns if the initial tank inventory gets down to ~25%).
 - The resulting product would have an RVP>7.0 psi but less than the maximum RVP allowed for the specific time period/region. All of the other PM specs would be below the applicable enforcement caps.
- **Oxy-free CaRFG to CARBOB** (typically would occur in the Fall)
 - Refiners would start to produce/ship complying CARBOB.
 - Terminals would start adding ethanol as soon as the CARBOB started to arrive into the terminal tanks.
 - Ditto above on RVP and PM specs.

Idealized Summer Terminal Transition Solution

CARBOB “A” to CARBOB “B”

- Pull terminal tanks to low inventory
- Add ethanol at greater of “A range” or “B range” following first two terminal tank-fill batches of CARBOB “B”
- After receiving third batch of CARBOB B, add ethanol at “B” range
- Resulting gasoline will be <7.2 psi RVP

Idealized Summer Terminal Transition Solution

CARBOB to non-oxygenated CaRFG

- Pull terminal tanks to low inventory
- Deliver two tank-fill batches of full-octane CARBOB to convert terminal tanks to full octane (difficult to blend)
- Continue adding ethanol to two tank batches
- Third batch received can be non-oxygenated CaRFG; stop ethanol addition
- *Ideally*, resulting gasoline will be <7.2 psi RVP (summer) and meet octane standards

Idealized Summer Terminal Transition Solution

Non-oxygenated CaRFG to CARBOB

- Pull terminal tanks to low inventory
- Deliver two tank-fill batches of sub-RVP CARBOB (difficult to blend)
- Begin adding ethanol upon receipt of first CARBOB
- Deliver normal-RVP CARBOB in third batch
- *Ideally*, resulting gasoline would be <7.2 psi RVP (summer), >6.4 psi RVP and meet octane standards